SMALL ENTITY

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Patent Application for

SUSPENSION SYSTEM FOR GLIDER EXERCISE DEVICE

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SUSPENSION SYSTEM FOR GLIDER EXERCISE DEVICE

Background of the Invention and Prior Art

This invention relates in general to glider type exercise equipment, such as the equipment described and claimed in the inventor's United States Patents 5,795,268, 5,857,940, D390,628 and D403,033, and in particular to a novel suspension system for such equipment. The patented exercise gliders feature very low impact in a device that simulates a full range of natural striding motion, including aggressive striding, for achieving an upper and lower body workout.

With the patented exercise devices, a full range of striding motion is very closely simulated while impact on the user's body is practically eliminated. Significantly, the aerobic effect experienced is readily controllable by merely accelerating the striding action and lengthening the stride, precisely as can be done when aggressively striding over a stationary surface. However, unlike striding, with the inventive device a user can lean backward and forward to transfer significant weight to his arms without loss of balance or control. This not only increases the aerobic effort and enables an upper body workout, but also varies the muscle groups that are being exercised.

The spring suspension system of the present invention adds a slight cushion effect to the rear of each foot platform for enhancing the gliding action. Essentially, tension springs permit the heel ends of the foot platforms to move up and down (within defined limits) to resiliently modify the radial paths traversed by the foot platforms. The effect is to further reduce the stress on both the user's body and the exercise machine structure. The novel suspension system is achieved with a simple, low cost, spring structure that may be readily added to the fold-away versions of the patented gliders.

Objects of the Invention

A principal object of the invention is to provide a novel suspension system for a low impact glider exercise apparatus.

Another object of the invention is to provide a novel glider exercise apparatus.

A further object of the invention is to provide an improved suspension system for a low impact glider exercise apparatus.

Brief description of the Drawings

These and other objects and advantages of the invention will become apparent upon reading the following description in conjunction with the drawings, in which:

FIG 1 is a perspective of a fold-away impact glider apparatus incorporating the suspension system of the invention;

FIG 2 shows the spring cage of the invention;

FIG 3 is a side elevation of the spring cage of FIG 2;

FIG 4 is a plan view of the spring retainer 55 of the spring cage;

FIG 5 is a cross section of the spring retainer of FIG 4, taken along the line 5-5;

FIG 6 is a plan view of the base 45 of the spring cage;

FIG 7 is an end view of base 45; and

FIG 8 is a partial cross section taken along line 8-8 of FIG 1 illustrating the attachment of the spring cage to the rear leg of the glider apparatus.

Summary of the Invention

The invention comprises a shock absorbing arrangement in the link that supports the swingable foot platform from the frame of a glider type exercise machine.

Description of the Preferred Embodiment

Referring to FIG 1, a glider type exercise apparatus 10 as shown in the above-mentioned patents includes a fold-away frame consisting of front legs 12,13 and rear legs 14,15 that are arranged for swingably supporting a pair of foot platforms 20,21. A pair of swing arms, 16,17, pivotally supported on a crossmember 18 of the frame, is pivotally connected to the toe ends of foot platforms 20,21, respectively. The heel ends of foot platforms 20,21 are coupled by heel end pivots 34,35 to a pair of links 24,26, respectively. The links 24,26 are in turn coupled, via spring cages 36,38 to a pair of rear pivots 30,31 on legs 12,13, respectively. While the links 24,26 may be rigid, in the preferred embodiments of the apparatus, the links comprise steel cables. The apparatus functions, in a well-known manner to enable a user standing on the foot platforms and grasping the swing arms to engage in an aerobic upper and lower body workout with minimal impact to his body.

FIGs 2 -7 illustrate various features of spring cage 36 of the invention, it being understood that spring cage 38 is a mirror image thereof. A top plate 40, preferably made of steel, is welded to the upper ends of a pair of steel tie rods 43,44 that are welded at their lower ends to a steel base plate 45 (FIG s 6 and 7) to form a generally cylindrical structure. Top plate 40 includes a hole 41 for pivotal mounting to rear pivot 30 and a small hole 42 for attaching the upper end of a tension spring 50. The lower end of tension spring 50 is connected to an intermediate member 52, preferably made of steel, that serves as a coupler for the upper end of link 24. In practice, link 24 is a cable having a threaded stud secured to its upper end for secure engagement with intermediate member (cable coupler) 52. A compression spring 54, which encircles link 24, has its lower end seated in a spring retainer 55 (FIGs 4 and 5). A polyurethane washer 53 is positioned atop compression spring 54 and serves to cushion the impact between

intermediate member 52 and compression spring 54 upon elongation of tension spring 50. A plastic shield 56 covers the major portions of spring cage 36.

As more clearly shown in FIGs 4 and 5, spring retainer 55 includes a pair of edge notches 59,60 that partially encircle the round circumferences of tie rods 43,44. The spring retainer has a central orifice 57 through which link 24 freely passes and a circular recess 58 for receiving the bottom end of compression spring 54. Spring retainer 55 is preferably made of a plastic material and is dimensioned such that it is a force fit between tie rods 43,44.

FIGs 6 and 7 show details of base plate 45, in particular the end notches 47,48 which are welded to the ends of tie rods 43,44, respectively and the central orifice 46, through which link 24 freely passes.

In FIG 8, details of the pivotal attachment of the spring cage to the upper (rear) part of front leg 12 are shown. Pivot 30 comprises a cylindrical pin 62 which passes through leg 12 and is engaged by a threaded screw 63 which includes a collar 64 and a head 65. A contoured support 67, through which pin 62 passes, engages the circular periphery of leg 12 and presents a flat surface that engages a plastic spacing washer 68. A plastic washer 66, having a stepped diameter for engaging hole 41 in top plate 40 and an inner hole engaging screw collar 64, centers the spring cage 36 on pin 62. A plastic cover 70 has a stepped orifice 71 for accepting a washer 66, with everything being secured together by the screw head 65. The arrangement enables free pivotal movement of spring cage 36 about pin 62, thus defining the rear pivot 30.

It will be appreciated by those skilled in the art that the spring cage may be located anywhere in the link, although its placement as shown at rear pivot 30 is preferred. In the preferred embodiment of the invention tension spring 50 has an overall length of 3.375 in. and a

spring rate of 76 lbs/in. and compression spring 54 has an overall length of 1.5 in. and a spring rate of 108 lbs/in.

What has been described is a novel suspension system for a glider type exercise device that further reduces the stress on the user's body and the exercise apparatus when performing provides a low impact simulation of walking and striding, including aggressive striding, aerobic upper and lower body exercises. It is recognized that numerous changes to the described embodiment of the invention will be apparent to those skilled in the art without departing from its true spirit and scope. The invention is to be limited only as defined in the claims.